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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/029,399	10/19/2001	Robert G. Batchko	BAT-101	2085
27652	7590	05/02/2006	EXAMINER	
JOSHUA D. ISENBERG 204 CASTRO LANE FREMONT, CA 94539			BOUTSIKARIS, LEONIDAS	
			ART UNIT	PAPER NUMBER
			2872	
DATE MAILED: 05/02/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

31

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/029,399	BATCHKO, ROBERT G.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Leo Boutsikaris	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 April 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 29-53 and 147-174 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 29-53 and 147-174 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/23/06 has been entered.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 29-36, 38-40, 43-53, 147-149, 151-157, 159, 161-174 are rejected under 35 U.S.C. 102(b) as being anticipated by Nishimoto (GB 2171535).

Regarding claim 29, Nishimoto discloses an optical processor (Fig. 5) comprising an optical module, wherein the optical module includes  $n$  addressable optical elements  $2_2$ - $2_n$ , where  $n > 2$ , the optical elements being positioned in series. Each addressable optical element may be in one of two states (depending on the position of switches  $4_2$ - $4_n$ ), the optical processor providing  $2^n$  addressable filter functions, wherein the  $n$  addressable optical elements are stacked in series

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such that light forming an image sequentially passes through all  $n$  addressable optical elements for all  $2^n$  addressable filter functions, wherein each of said filter functions produces a unique transform between an object and an image, whereby there are  $2^n$  unique transforms (since there are  $2^n$  discrete focal points  $F_1, F_2 \dots F_N$ ), see lines 110-127, p. 2.

Regarding claims 30-31, all the transforms are related since they comprise various focal imaging lengths of corresponding thin lenses stacked in series.

Regarding claim 32, each of the  $2^n$  transforms images the input object at a different output/image plane, where there are  $2^n$  such planes (lines 120-122, p. 2).

Regarding claim 33, each of the  $2^n$  addressable output plane locations lies along the same optical axis as the input plane (see Fig. 5).

Regarding claim 34, the operation may be such that the focal points are uniformly spaced (lines 128-129, p. 2).

Regarding claim 35, there are  $2^n$  addressable magnifications (since there are  $n$  different lenses), see lines 113-114, p. 2.

Regarding claim 36, each of the  $2^n$  transforms images the object at a different deflection angle (see Fig. 5).

Regarding claim 38, the optical elements can be randomly addressed to the extent that they respond to received inputs, which may be random.

Regarding claim 39, each of the  $n$  addressable optical elements is characterized by two states.

Regarding claim 40, each of the two states is characterized by a different value for an optical property (e.g., polarization state of output light) of the given addressable optical element.

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Regarding claim 43, change in the polarization state of the output light corresponds to change in the focal length of the corresponding birefringent lens.

Regarding claims 44-45, each of the optical lenses is a thin lens because of the small axial size, thus producing a composite focal length given by the equation of claim 44 (for illustration purposes only, see equation 5.39 in Hecht).

Regarding claim 46, the unique transform is an image distance transform.

Regarding claims 47-53, the focal length of the module is determined by the status of each lens/polarization plane rotating element, which in turn is determined by the value of a control signal in the form of an applied voltage, which is typically digital, comprising a plurality of bits, which correspond to the various values of the composite focal length of the module. Each digital input voltage signal results in a corresponding analog output optical signal (e.g., an image).

Regarding claims 147-148, the variable focal length device of Fig. 5 includes a nonlinear optical medium 6 whose state is varied and contributes to the output position of the image.

Regarding claim 149, the optical module includes an optical medium having  $n$  subsections that define the addressable optical elements (in the same sense as in Fig. 2A of the present specification).

Regarding claims 151, 153, 159, 161, the nonlinear optical medium 6 may be  $\text{KH}_2\text{PO}_4$  (line 51, p. 2).

Regarding claim 152, the means for altering the optical properties of the addressable elements include contact pads and a voltage source coupled to the pads (see Fig. 5).

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Regarding claims 154-155, the device of Fig. 5 can be considered as having a first and a second optical module, each module performing a lens operation along an axis.

Regarding claims 156-157, the optical medium  $\text{KH}_2\text{PO}_4$  exhibits second order nonlinearities.

Regarding claims 162-165 the optical medium may be a liquid crystal lens element 6, which has two or more states of its refractive index depending on the applied voltage via contact pads (lines 23-25, 34-37, p. 2).

Regarding claims 166-167, there is glass or plastic in the form of lenses 3 proximate to the contact pads of each optical medium 2.

Regarding claims 168-169, there is liquid crystal material dispersed within the electro-optic medium, constituting lens element 6.

Regarding claims 170-171, the dispersed liquid crystal is birefringent, which implies that the material has an ordinary and extraordinary axis (lines 99-103, p. 2)

Regarding claim 172, the system of Fig. 5 includes polarization rotators  $2_2-2_n$  (lines 111-112, p. 2).

Regarding claim 173, the polarization rotators are electro-optic half-wave plates (line 59-62, p.1).

Regarding claim 174, the device further includes a polarizer 1 (line 53, p. 1).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 37, 41-42, 158 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishimoto (GB 2171535) in view of Popovich (US 6,356,366).

Nishimoto discloses all the limitations of said claims except for showing that each addressable optical element is a switchable holographic optical element, especially in the form of a holographic lens comprising a liquid crystal structure. Popovich discloses an optical processor (Fig. 1) comprising an optical module 10, wherein the optical module 10 includes a plurality of addressable optical elements 26, 28, 30, wherein the addressable optical elements are positioned in series (lines 32-65, col. 2). Furthermore, each holographic optical element is a holographic lens in the form of fringes incorporated within a liquid crystal structure (lines 38-49, col. 3, 8-14, col. 4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the combination lens/polarization plane rotating element of Nishimoto with a switchable holographic lens of Popovich, since the latter comprises a single element as opposed to the combination of two elements of the former, and it smaller, easier to make and offers more flexibility in choosing the various values of the varied optical property, e.g., the focal distance.

Regarding claim 158, the holographic element of Popovich has third order nonlinearity, being of holographic nature.

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Claims 150, 160 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishimoto (GB 2171535) in view of Popovich (US 6,356,366) and further in view of Waldern (US 6,407,724).

Nishimoto in view of Popovich discloses all the limitations of said claims except for teaching that the switchable holographic elements may be optically addressed. Waldern discloses switchable holographic optical elements, which may be selectively acted upon by using optical addressing (lines 16-24, col. 14). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use optical addressing to affect changes on the holographic elements of the optical processor of Nishimoto in view of Popovich, since optical addressing offers a much higher connection speed than accessing via electrical wiring.

### ***Response to Applicant's Arguments***

Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Leo Boutsikaris whose telephone number is 571-272-2308.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR



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system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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April 30, 2006



**LEONIDAS BOUTSIKARIS**  
**PRIMARY EXAMINER**